

Claims

5 1. A method for defining at least one object to be included into a hierarchical object structure, said hierarchical object structure being constituted by a plurality of objects being hierarchically associated,
said plurality of objects comprising different types of objects out of a group including at least a fixed object, a run-time object, a leaf object and a link object, each of said objects having at least one superordinate arranged object, wherein said objects having said fixed object and run-time object types are allowed to have subordinate arranged objects;
10 wherein said method comprises:
- defining said at least one object to be associated to a parent object which is directly arranged superordinate to said at least one object and is part of said hierarchical object structure by:
- 15 checking said type of said parent object;
- in case said parent object is of said fixed object type:
defining said at least one object having a type out of a group comprising said fixed object, said run-time object, said leaf object and said link object;
- 20 in case said parent object is of said run-time object type:
defining said at least one object having a type out of a group comprising said fixed object, said leaf object and said link object; and
- defining properties of said at least one object;
25 wherein said hierarchical object structure being constituted by said plurality of objects describes and allows generation of a hierarchical node structure constituted by a plurality of nodes;
wherein said hierarchical node structure comprising said plurality of nodes is employed for distributing management related information of an electronic device among said plurality of nodes, certain parts of said management related information being assigned to at least one of said plurality of nodes;
30 wherein said plurality of objects serves as template objects for deriving corresponding nodes and said hierarchical object structure serves as a template structure for deriving said corresponding hierarchical node structure.

2. A method according to claim 1, comprising:

- checking whether said parent object has already one or more associated objects being directly arranged subordinate to said parent object;
- in case at least one of said one or more already existing objects is of said run-time object type:
 - rejecting said defining of said at least one object.

5 3. A method according to claim 1, comprising:

- checking whether said parent object is of said fixed object type;
- checking whether said parent object has already one or more associated objects being directly arranged subordinate thereto; and
- checking whether said at least one object is of said fixed object type:
 - in case said parent object has no already associated objects and said parent object and said at least one object are of said fixed objects type:
 - concentrating said parent object and said at least one object by replacing said parent object and said at least one object with one combined new object being of a fixed object type.

10 4. A method according to claim 1, comprising:

- coding at least a part of a description document being based on said definition of said at least one object and comprising information relating to said at least one object and said properties of said at least one object; said coded description document allowing for generating a hierarchical node structure for storing said management related information.

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5. A method according to claim 1, wherein said hierarchical object structure is an information being part of the device description framework and said hierarchical node structure comprising a plurality of nodes is a management tree employed for device management according to the synchronization markup language device management (SyncML DM) standard defined by the SyncML Initiative.

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6. A method according to claim 1, wherein said description document is at least a part of a device description framework (DDF) document, said device description framework (DDF) document being an extended markup language (XML) encoded document being encoded in accordance with a corresponding description framework document type description (DTD).

7. A software tool for defining a hierarchical structure consisting of a plurality of entities, comprising program portions for carrying out the operations of claim 1 when said program is implemented in a computer program for being executed on a processing device, a networked device, a networked server, a terminal device or a communication terminal device.

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8. A computer program product for defining a hierarchical structure consisting of a plurality of entities, comprising loadable program code sections for carrying out the operations of claim 1 when said computer program is executed on a processing device, a networked device, a networked server, a terminal device or a communication terminal device.

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9. A computer program product for defining a hierarchical structure consisting of a plurality of entities, wherein said computer program product comprises program code sections stored on a computer readable medium for carrying out the method of claim 1 when said computer program product is executed on a processing device, a networked device, a networked server, a terminal device or a communication terminal device.

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10. A computer data signal embodied in a carrier wave and representing a program which, when executed by a processor, causes the method of claim 1 to be carried out.

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11. A processing device having a processing unit, a memory unit and a communication interface, said processing unit being interconnected with said memory unit and said communication interface, wherein said processing unit is configured for defining at least one object to be included into a hierarchical object structure, said hierarchical object structure being constituted by a plurality of objects being hierarchically associated,

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said plurality of objects comprising different types of objects out of a group including at least a fixed object, a run-time object, a leaf object and a link object, each of said objects having at least one superordinate arranged object, wherein said objects having said fixed object and run-time object types are allowed to have subordinate arranged objects;

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wherein said processing unit is configured for:

- defining said at least one object to be associated to a parent object which is directly arranged superordinate to said at least one object and is part of said hierarchical object structure by:

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- checking said type of said parent object;

- in case said parent object is of said fixed object type:

defining said at least one object having a type out of a group comprising said fixed object, said run-time object, said leaf object and said link object;

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- in case said parent object is of said run-time object type:

defining said at least one object having a type out of a group comprising said fixed object, said leaf object and said link object; and

- defining properties of said at least one object;

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wherein said hierarchical object structure being constituted by said plurality of objects describes and allows generation of a hierarchical node structure constituted by a plurality of nodes;

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wherein said hierarchical node structure comprising said plurality of nodes is employed for distributing management related information of an electronic device among said plurality of nodes, certain parts of said management related information being assigned to at least one of said plurality of nodes;

wherein said plurality of objects serves as template objects for deriving corresponding nodes and said hierarchical object structure serves as a template structure for deriving said corresponding hierarchical node structure.

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12. A management system comprising a managed mobile communication enabled device and a hierarchical object structure, said hierarchical object structure being constituted by a plurality of objects being hierarchically associated, wherein each object of said plurality of objects has a certain object type which is an object type out of the group comprising at least fixed object, run-time object, leaf object and link object;

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wherein each of said plurality of objects has at least one superordinate arranged object, wherein each object of said plurality of objects having said fixed object type and run-time object type is allowed to have subordinate arranged objects;

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wherein in case a parent object which is directly arranged superordinate to one object and is part of said hierarchical object structure has said fixed object type, said one object has a type out of a group comprising said fixed object type, said

run-time object type, said leaf object type and said link object type and in case
said parent object which is directly arranged superordinate to one object and is
part of said hierarchical object structure has said run-time object type, said one
object has a type out of a group comprising said fixed object type, said leaf
object type and said link object type;
5 wherein said hierarchical object structure being constituted by said plurality of
objects describes and allows generation of a hierarchical node structure
constituted by a plurality of nodes;
wherein said hierarchical node structure comprising said plurality of nodes is
10 employed for distributing management related information of said managed
mobile communication enabled device among said plurality of nodes, certain
parts of said management related information being assigned to at least one of
said plurality of nodes;
wherein said managed mobile communication enabled device has at least a
15 device management agent which
generates at least a part of said hierarchical node structure from said hierarchical
object structure to establish said part of said hierarchical node structure and to
implement said part of said hierarchical node structure into said managed mobile
communication enabled device;
20 distributes management related information among said plurality of nodes
constituting said hierarchical node structure; and
retrieves at least parts of said management related information from one or more
nodes of said plurality of nodes for configuring functions of said managed
mobile communication enabled device and/or applications running on said
25 managed mobile communication enabled device to be operable.

13. A management system according to claim 12, wherein each object of said
plurality of objects is allowed to have only one directly subordinate arranged
object which has said run-time object type.
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14. A management system according to claim 12, wherein said hierarchical object
structure has a concentrated object which has said fixed object type, wherein
said concentrated object is constructed from a parent object and a child object,
wherein said parent object is an object which is directly arranged superordinate
35 to said child object, wherein said concentrated object is implemented in case
that:

- said parent object has said fixed object type;
- said child object has said fixed object type; and
- said child object is the only object which is directly arranged subordinate to said parent object.

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15. A management system comprising a managed mobile communication enabled device and a hierarchical node structure,

wherein said hierarchical node structure comprising said plurality of nodes is employed for distributing management related information of said managed mobile communication enabled device among said plurality of nodes, certain parts of said management related information being assigned to at least one of said plurality of nodes;

10 wherein each node of said plurality of nodes has a certain node type which is a node type out of the group comprising at least fixed node, run-time node, leaf node and link node;

15 wherein each of said plurality of nodes has at least one superordinate arranged node, wherein each node of said plurality of nodes having said fixed node type and run-time node type is allowed to have subordinate arranged nodes;

20 wherein in case a parent node which is directly arranged superordinate to one node and is part of said hierarchical node structure has said fixed node type, said one node has a type out of a group comprising said fixed node type, said run-time node type, said leaf node type and said link node type and in case said parent node which is directly arranged superordinate to one node and is part of said hierarchical node structure has said run-time node type, said one node has a type out of a group comprising said fixed node type, said leaf node type and said link node type;

25 wherein said managed mobile communication enabled device has at least a device management agent which distributes management related information among said plurality of nodes constituting said hierarchical node structure and which retrieves at least parts of said management related information from one or more nodes of said plurality of nodes for configuring functions of said managed mobile communication enabled device and/or applications running on said managed mobile communication enabled device to be operable.

35 16. A management system according to claim 15, wherein two or more child nodes which have said run-time node type and which have a same parent node have a

common format, wherein said parent node is directly superordinate arranged to said to or more child nodes,
wherein said common format determines that management related information distributed among said two or more child nodes having said run-time node type
5 relates to the same function of said managed mobile communication enabled device and/or application running on said managed mobile communication enabled device.

17. A management system according to claim 15, wherein said hierarchical node
10 structure has a concentrated node which has said fixed node type, wherein said concentrated node is constructed from a parent node and a child node, wherein said parent node is a node which is directly arranged superordinate to said child node, wherein said concentrated node is implemented in case that:
15 - said parent node has said fixed node type;
- said child node has said fixed node type; and
- said child node is the only node which is directly arranged subordinate to said parent node.